REMARKS

Claims 1-12 and 14-22 are pending. Claims 1-12 and 14-16 are amended. Claim 13 is canceled. Claims 17-22 are new.

Abstract

A new abstract is provided herein. No new matter has been added.

Specification Amendments

The specification has been amended to describe a base of the disclosed contact part, and to improve readability. No new matter has been added.

Claim Amendments

Claims 1-12 and 14-16 have been amended to improve clarity and readability. Claims 14-16 have been amended to depend from new claim 18 in view of the cancellation of previous claim 13.

New claim 17 recites a sliding electrical contact part comprising only one layer of material, wherein the layer of material has a low electrical resistivity and comprises carbon, copper, zinc and iron particles of a size less than 500 gm. The subject matter of claim 17 is fully supported by the disclosure at lines 18-20 of page 4, for example.

New claim 18 recites an electrical brush comprising the contact part of claim 1.

New claim 19 recites an electrical brush comprising the contact part of claim 17.

New claims 20-22 are similar to claims 14-16, but depend from claim 19.

No new matter has been added.

Objection to the Drawings

Applicant respectfully requests withdrawal of the objection to the application for lacking drawings and for lacking a reference sign for the claimed "base".

Applicant respectfully submits that the original application included Figs. 1A, 1B and 2.

The application is a National Stage application of International application PCT/FR04/001987. Applicant's copy of the National Stage application as filed includes FIGS. 1A, 1B and 2. In the event the copy filed in the U.S. Patent and Trademark Office did not include the drawings, applicant submits that the introduction of such drawings does not constitute new matter, as the drawings were included in the International application. Applicant attaches hereto replacement drawings including FIGS. 1A, 1B and 2. In the replacement drawings, a base is indicated with reference sign "20."

Objection to the Claims

Applicant respectfully requests withdrawal of the objection to claim 1 for reciting "multi-layer." The term has been amended to read "multi-layered," as suggested by the Examiner.

Objection to the Specification

Applicant respectfully requests withdrawal of the objection to the specification for failing to provide a reference sign for the "base." The paragraph at lines 22-32 of page 5 has been amended to describe a "base 20." No new matter has been added.

Claim Rejections – 35 U.S.C. §112

Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 13-16 under 35 U.S.C. §112, second paragraph based on the allegedly indefinite recitation of "at least one contact part of claim 1." Claim 13 has been canceled. Claims 14-16 now depend from claim 18, which recites "the contact part of claim 1."

Claim Rejections 35 U.S.C. §103

Claims 1-3, 6-10 and 13-16

Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 1-3, 6-10 and 13-16 under 35 U.S.C. §103(a) as being unpatentable over Otani et al. (US 7,067,951) in view of Whitehart (US 3,601,645).

Claim 13 is canceled, and the rejection of claim 13 is therefore moot.

The claimed invention concerns a sliding electrical contact part of an electrical brush. An

objective of the claimed invention is to provide sliding contact parts of electrical bushes that are free from lead or antimony, so as to provide high performance in electrical devices that require high current densities and high friction speeds.

According to claim 1, the sliding contact part contains carbon, copper, zinc and iron and is multi-layer, with at least one layer composed of a material of low resistivity and at least one layer composed of material of higher resistivity. The layer of low resistivity contains zinc and iron, and the iron comprises iron particles of less than 500 μm in size.

Otani et al. disclose a lead-free, copper-graphite brush comprising a copper-graphite brush body and an outer terminal connected to the brush body. The main objective of Otani et al. is to increase the resistance of the connection between the brush body and the outer terminal. (See co. 1, lines 1-57 of Otani et al.). As described in col. 1, lines 58-63 of Otani et al., the resistance is increased by adding a copper-zinc alloy to the brush body or the connection between the brush body and the outer terminal. Two embodiments are disclosed by Otani et al.: 1) the embodiment of Fig. 2 (see col. 4, lines 39-57); and 2) the embodiment of Figs. 4 and 5 (see col. 5, lines 24-43).

In the embodiment of Fig. 2, the brush 12 comprises: a commutator side member 14 comprising copper, graphite and a metal sulfide lubricant; and a lead member comprising copper, granite, brass and the metal sulfide lubricant. In this embodiment, brass particles are added *only in the area if the embedment part 8 of the lead 6; no brass is added to the commutator contact face side 7 of the brush body.* (See col. 4, lines 39-43). In the embodiment of Figs. 4 and 5, *no brass is added to the powder material for the brush body 44*, but *the lead wire 46 is spotted with a paste comprising brass particles.* The brushes of these embodiments have a contact part which is *not multi-layer* as claimed, but is mono-layer. Furthermore, *the contact part does not contain either zinc or iron*, as claimed.

Whitehart discloses electric contact brushes including a flexible electrical conductor attached to the body of the brush. The objective of Whitehart is to provide an excellent physical and electrical bond between the electrical conductor and the body of the brush. (See col. 1, lines 1-26, col. 1, lines 44-53 and col. 3, lines 7-8 of Whitehart). To achieve this objective, the brush includes a body 1 containing metal and carbon, a metallic layer 2 sintered with the body, and an electrical conductor 3 secured to the metallic layer 2, wherein

the metallic layer 2 has a greater tensile strength than the tensile strength of the body 1. (See col. 1, lines 28-33). Figs. 1 and 2 show separate embodiments illustrating two ways of securing the conductor 3 to the metallic layer 2. Specifically, Fig. 1 shows a welded joint 4 (see col. 2, lines 9-13), and Fig. 2 shows a bore 5 in which one end of the conductor 3 is fixed by tamping with copper particles 6 (see col. 2, lines 14-17). The body 1 is composed primarily of copper and graphite, and may also include lead, tin and/or zinc (col. 2, lines 22-30). As disclosed in col. 2, lines 3-5 and col. 4, lines 5-10, the metallic layer 2 can be composed of copper and iron.

As is clear from the above discussion, Otani et al. and Whitehart disclose alternative solutions to the same problem - specifically, how to provide an excellent physical and electrical bond between the electrical conductor and the body of the brush. One of ordinary skill in the art would choose one solution or the other, but would not be inclined to combine the two incompatible teachings. Specifically, in Otani et al., the portion of the brush in contact with the electrical conductor is a member 16 comprising copper, graphite and brass, whereas Whitehart provides a metallic layer 2. The Whitehart teaching of a metallic layer cannot be logically combined wit the Otani et al. teaching of forming a member of the brush from copper, graphite and brass.

Furthermore, neither Otani et al. nor Whitehart teach or suggest a sliding contact: 1) that contains carbon, copper zinc and iron; 2) that is multi-layer and has at least one layer composed of a material of low resistivity and at least one layer composed of a material of higher resistivity; 3) that contains a layer of low resistivity containing zinc and iron; or 3) that has iron particles of less than 500 μm in size.

For at least the above reasons, claim 1 is allowable over Otani et al. and Whitehart. Claims 2, 3, 6-10, 14-16 and 18 depend from claim 1, and are allowable over Whitehart for at least this reason.

According to new claim 17, the sliding electrical contact part contains carbon, copper, zinc and iron, and is a mono-layer composed of a material of low resistivity. The material of low resistivity contains zinc and iron, and the iron comprises iron particles of less than 500 μm in size. Claim 17 is therefore similar to claim 1, with the exception that the contact part of claim 17 is mono-layer and lacks a layer of higher resistivity. Claim 17 is therefore

allowable over Otani et al. and Whitehart for mostly the same reasons that claim 1 is allowable, except that the contact part of claim 1 is further distinguished by being a multi-layer part with an additional layer of higher resistivity. Claims 19-22 depend from claim 17, and are allowable over Whitehart for at least this reason.

Claims 11 and 12

Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 11 and 12 under 35 U.S.C. §103(a) as being unpatentable over Otani et al. and Whitehart, further in view of Munday (US 1,807,794).

Claims 11 and 12 depend from claim 1. Otani et al. and Whitehart fail to teach or suggest the invention of claim 1 for the reasons provided above. Munday fails to teach or suggest the features of claim 1 that are missing from the Otani et al. and Whitehart disclosures. Therefore, claims 11 and 12 are allowable over Otani et al., Whitehart and Munday.

Allowable Subject Matter Indicated by Examiner

Applicant thanks the Examiner for the indication of allowable subject matter in claims 4 and 5.

CONCLUSION

In view of the foregoing remarks, Applicant respectfully asserts that the rejections as set forth in the Office Action of April 24, 2008 have been addressed and overcome. Applicant further respectfully asserts that all claims are in condition for allowance and requests that a Notice of Allowance be issued. If issues may be resolved through Examiner's Amendment, or clarified in any manner, a call to the undersigned attorney at (703) 394-2243 is courteously solicited.

The Commissioner is hereby authorized to charge any required fees or credit any overpayment to Deposit Account No. 09-0528.

Respectfully submitted,

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